

WHAT IS CLAIMED IS:

1. A heat-shrinkable multilayer film comprising:

(A) a first layer, which is an outer layer, and which comprises polyolefin;

(B) a second layer comprising at least one member selected from the group

5 consisting of polyolefin, polystyrene, and polyurethane;

(C) a third layer comprising at least one member selected from the group
consisting of amorphous polyester and polyester having a melting point of from about
130°C to about 260°C;

(D) a fourth layer, which is an outer layer, the fourth layer comprising at least one
10 member selected from the group consisting of polyester, polyamide and polyurethane.

2. The heat-shrinkable film according to Claim 1, wherein the film has a total free
shrink, at 185°F, of from about 40 to 170 percent.

15 3. The heat-shrinkable film according to Claim 1, wherein the third layer comprises
an amorphous polyester and the fourth layer comprises at least one member selected from
the group consisting of amorphous polyester and polyester having a melting point of from
about 130°C to about 260°C.

20 4. The heat-shrinkable film according to Claim 1, wherein the fourth layer
comprises at least one member selected from the group consisting of amorphous
polyamide and polyamide having a melting point of from about 130°C to about 250°C.

25 5. The heat-shrinkable film according to Claim 1, wherein the fourth layer
comprises a polyester having from about 70 to 95 mole percent terephthalate mer units.

6. The heat-shrinkable film according to Claim 1, wherein the film has a gloss of at
least 50 percent, as measured against the fourth layer by ASTM D2457.

7. The heat-shrinkable film according to Claim 1, wherein the film has a total thickness of from about 1 to about 5 mils.

8. The heat-shrinkable film according to Claim 7, wherein the film has a total
5 thickness of from about 1.5 to about 3 mils.

9. The heat-shrinkable film according to Claim 1, wherein the film further comprises a fifth layer which serves as an O₂-barrier layer and which is between the third layer and the fourth layer, the fifth layer comprising at least one member selected from the
10 group consisting of EVOH, PVDC, polyalkylene carbonate, polyamide, and polyethylene naphthalate.

10. The heat-shrinkable film according to Claim 9, further comprising a sixth layer which comprises at least one member selected from the group consisting of polyester and
15 polyamide, the sixth layer being between the fourth layer and the fifth layer.

11. The heat-shrinkable film according to Claim 10, further comprising:
a seventh layer which is a tie layer, the seventh layer being between the second layer and the third layer; and
20 an eighth layer which is a tie layer, the eighth layer being between the fourth layer and the sixth layer.

12. The heat-shrinkable film according to Claim 9, wherein the first layer comprises ethylene/alpha-olefin copolymer; the second layer comprises ethylene/vinyl
25 acetate copolymer; the third layer comprises polyethylene terephthalate; the fourth layer comprises polyethylene terephthalate; and the fifth layer comprises EVOH.

13. The heat-shrinkable film according to Claim 9, wherein, based on total film thickness, the first layer has a thickness of from about 1 to 60 percent, the second layer
30 has a thickness of from about 1 to 50 percent, the third layer has a thickness of from about

5 to 40 percent, the fourth layer has a thickness of from about 1 to 40 percent, and, the fifth layer has a thickness of from about 1 to 20 percent.

14. The heat-shrinkable film according to Claim 13, wherein, based on total film thickness, the first layer has a thickness of from about 10 to 30 percent, the second layer has a thickness of from about 5 to 25 percent, the third layer has a thickness of from about 10 to 25 percent, the fourth layer has a thickness of from about 4 to 20 percent, and the fifth layer has a thickness of from about 5 to 15 percent.

15. The heat-shrinkable film according to Claim 9, wherein the second layer is between the first layer and the third layer, the third layer is between the second layer and the fifth layer, and the fifth layer is between the third layer and the fourth layer.

16. The heat-shrinkable film according to Claim 1, wherein the film has a haze of less than about 10%, as measured by ASTM D1003.

17. The heat-shrinkable film according to Claim 1, wherein the first layer comprises a blend of homogeneous ethylene/alpha-olefin copolymer and heterogeneous ethylene/alpha-olefin copolymer.

18. The heat-shrinkable film according to Claim 1, wherein the film comprises a crosslinked polymer network.

19. The heat-shrinkable film according to Claim 1, wherein the film has a total free shrink, at 185°F, of from about 60 to 150 percent; an impact strength of at least 60 Newtons, as measured by ASTM D3763; a gloss of at least 50 percent, as measured by ASTM D2457; and a haze of less than 10%, as measured by ASTM D1003.

20. A bag comprising a heat-shrinkable multilayer film comprising:

(A) a first layer, which is an outer layer, and which comprises polyolefin;

(B) a second layer comprising at least one member selected from the group consisting of polyolefin, polystyrene, and polyurethane;

(C) a third layer comprising at least one member selected from the group consisting of amorphous polyester and polyester having a melting point of from about 130°C to about 260°C;

(D) a fourth layer, which is an outer layer, the fourth layer comprising at least one member selected from the group consisting of polyester, polyamide and polyurethane; and wherein the bag is produced by sealing the first layer to itself, whereby the first layer is an inside bag layer and the fifth layer is an outside bag layer.

21. The bag according to Claim 20, wherein the heat-shrinkable film further comprises a fifth layer which serves as an O₂-barrier layer, the fifth layer comprising at least one member selected from the group consisting of EVOH, PVDC, polyalkylene carbonate, polyamide, and polyethylene naphthalate.

22. A process for packaging a product, comprising the steps of:

(A) placing a first product into a flexible, heat-shrinkable bag, the bag having an open top, whereby a first bagged product having excess bag length results, and wherein the bag comprises a heat-shrinkable multilayer film comprising:

- (1) a first layer, which is an inside bag layer, and which comprises polyolefin;
- (2) a second layer comprising at least one member selected from the group consisting of polyolefin, polystyrene, and polyurethane;
- (3) a third layer comprising at least one member selected from the group consisting of amorphous polyester and polyester having a melting point of from about 130°C to about 260°C; and
- (4) a fourth layer, which is an outside bag layer, the fourth layer comprising at least one member selected from the group consisting of polyester, polyamide, polypropylene and polyurethane; and

wherein the bag is produced by sealing the first layer to itself, whereby the first layer is an inside bag layer and the fourth layer is an outside bag layer;

- (B) repeating the placing step with a second product and a second bag, whereby a second bagged product results;
- (C) stacking at least the first and second bagged products so that the excess bag length of each of the bagged products are within a sealing distance of a means for heat-sealing;
- (D) heat-sealing the inside layer of first bag to itself in the region between the open end of the first bag and the product, and the inside layer of the second bag to itself in the region between the open end of the second bag and the product, so that the first product is completely sealed within the first bag and the second product is completely sealed with the second bag, the sealing being carried out at a temperature so that the resulting packaged products can be freely separated from one another without layer delamination.

23. The process according to Claim 22, wherein the second layer has a thickness of from about 5 to about 50%, based on the thickness of the heat-shrinkable multilayer film.

24. The process according to Claim 22, wherein the heat-shrinkable film further comprises a fifth layer which serves as an O₂-barrier layer, the fifth layer comprising at least one member selected from the group consisting of EVOH, PVDC, polyalkylene carbonate, polyamide, and polyethylene naphthalate.

25. The process according to Claim 22, wherein the process is carried out in a rotary chamber vacuum machine.

26. The process according to Claim 25, wherein 2 bagged products are stacked on top of one another during heat-sealing.

27. The process according to Claim 22, wherein from 2 to 5 bagged products are stacked on top of one another during heat-sealing.